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Moving beyond the illusion of participation in the governance of Yangambi Biosphere Reserve (Tshopo Province, Democratic Republic of Congo)

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Abstract

The participation of local communities in the governance of protected areas in the Democratic Republic of Congo is challenged by several external and local factors. This article aims to understand the representation of local communities and factors that influence their participation in the governance of the Yangambi Biosphere Reserve. Three principal sources of information (archival records, focus group and semi-structured interviews) were used to collect data. The results indicate a top-down participatory approach. The cumulative failure of several projects in the context of local development has led to different perceptions by local communities of their role in the participative governance of Yangambi Biosphere Reserve. Initiatives in participatory management and local development only function during the lifetime of externally-funded projects when initiators are present in the intervention area. The results call into question formal claims made by both conservation projects and the Congolese government regarding the actual participation of local communities in the governance of Biosphere Reserves. Furthermore, although Biosphere Reserves in DRC are recognized as part of the national network of protected areas since 2002, their management is still not aligned to either the Seville Strategy or the statutory framework of the world network of Biosphere Reserves. To achieve this, local development initiatives need to focus on poverty alleviation (through the diversification of income sources, entrepreneurship, farmer training and the creation of employment opportunities) and a better understanding of local practices and cultures in the design of such projects.

Keywords

Democratic Republic of Congo, Yangambi Biosphere Reserve, governance, protected areas, community participation

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Introduction

As noted by Mehta and Kellert (1998), "community-based conservation (CBC) has been projected as the most practical approach to stem biodiversity loss in developing countries. Since CBC is 'people centred' and experience with it is relatively new, it is important to know the views of local communities regarding implemented policies and programmes". In some developing countries, nature conservation in protected areas (PAs) is poorly supported by local communities (LCs) (Bennett and Dearden 2014a). While some studies indicate that protected areas help to improve the socio-economic conditions of local people, the reality in many developing countries, particularly in Africa and Southeast Asia, suggests the opposite (Christie 2004). Despite the often disappointing outcomes in Africa (Blaikie 2006), the participation of local actors in the management of PAs is based on two fundamental logics: the questioning of top-down approaches, which are considered less able to articulate solutions adapted to local needs, and the recognition of the capacity of local actors to take the reins of their own development into their own hands (Ribot1999; Poteete and Ribot 2011).

Participation is, nevertheless, a concept that divides social actors and scientists and has not found a unanimous definition. Following Rodaly (1998),"depending on the degree of actors" involvement, participation extends from simple information on projects developed and managed by external actors, to taking the initiative of the local populations without professional intervention. It thus takes different forms: consultation, material or financial incentive, participation in the running of programs and participation in the decision". Meister (1977) distinguishes three modes of participation: voluntary participation, on the initiative of the participants, in relation to the objectives and goals they choose themselves; participation elicited by an objective approved by the community but whose aims are determined by external actors; and participation of group members through membership (of a group or association) and learning. Stakeholder involvement in forest policy and management decisions has increased over the last twenty years in Central Africa (Buttoud and Nguinguiri 2016). In the Democratic Republic of Congo (DRC), even though community participation practices existed before independence (for example, rural cooperatives, self-help associations and public enquiries with local communities), it was formally incorporated into law when the Forest Code was promulgated in 2002. Overall, participation, through locally-owned processes, tends to improve the use of resources and environmental management (Kellert et al. 2000; Borrini-Feyerabend et al. 2007).

The implementation of this approach in the management of Biosphere Reserves has not been extensively studied. Despite being part of a global network, thanks to recognition by the United Nations Educational, Scientific and Cultural Organization (UNESCO) in 1977, few studies have been conducted on the socio-economic impacts of Biosphere Reserves (see Rao et al. 2003). This paper analyses the contribution of local development initiatives and the degree of peoples' participation in the governance of the Yangambi Biosphere Reserve (YBR), focusing on the representation of local communities, and the factors that influence it. Community development and participatory initiatives implemented in Yangambi since the colonial era to the pre-

sent-day have not led to any significant improvement in the living conditions of the rural communities living in and around YBR. The national institute for agricultural study and research in Congo (INERA), which manages YBR, has been affected by the crisis affecting state services (Hiergens 2010). This has resulted in the widespread occupation and use of YBR by local communities struggling to survive through hunting, fishing, agriculture, logging, making canoes and mining, underlining the structural bankruptcy of the Congolese State. The reserve thus has become an area where the different actors have difficulties reconciling their interests. On the one hand, land conflicts oppose LCs and the INERA, and the other hand, different LCs themselves.

Materials and methods

Study site

The YBR is located about 100 km west and 62 km north of the city of Kisangani in the DRC (Map 2). At its creation in 1939, YBR was known as the "Réserve Floristique de Yangambi". Its legal area was estimated at 225,000 hectares when gazetted during the colonial period (INEAC 1939). Its geographical coordinates are between 24°18' and 25°08' of longitude East and 00°43' and 01°08' of latitude North, with altitudes varying between 400 and 500 m. The region is located in the equatorial zone with a climate of the type *Af of Köppen*. The average annual rainfall in the study area is 1,837 mm (Kombele 2004). YBR's streams and rivers flow either into the Congo River in the southwest, the Aruwimi River in the North, or the Lindi River in the East. The area was the subject of extensive floristic and agronomic studies carried out during the colonial era by National Institute for Agronomic Study in the Belgian Congo (INEAC) scientists. Today, Yangambi boasts a herbarium, xylarium (tropical wood collection), poorly equipped research laboratories and a library as well as coffee, cocoa, banana, oil palm, rubber and tree plantations (Hiergens 2010). Before the establishment of the Yangambi Research Centre, Turumbu and Bamanga indigenous communities inhabited the area and practiced their customary hunting, fishing, agriculture and artisanal logging activities as well as the collection of non-timber forest products. The survival of these autochthones people depended mainly on the forest.

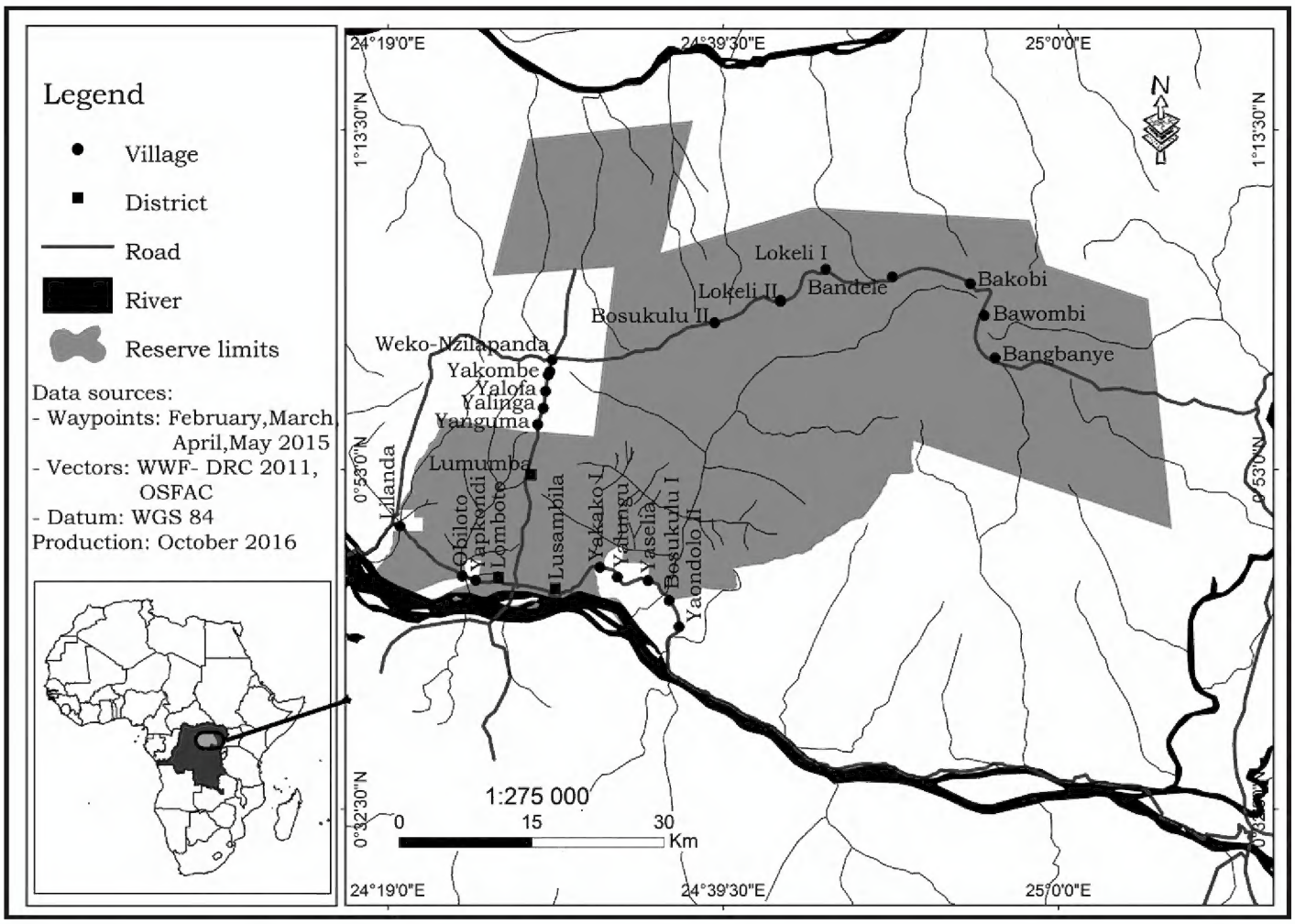
Data sources and sampling

The data presented in this article are from archival sources as well as focus group discussions and semi-structured interviews. The documentation was consulted at the libraries of INERA and the Man and the Biosphere (MAB) offices in Yangambi and Kinshasa, DRC, the Royal Museum of Central Africa (RMCA), Turvueren and the Botanical Gardens, Meise in Belgium. Analysis of these documents was conducted to trace and develop a better understanding of the policies and projects implemented in and around YBR since its creation. Focus group discussions, understood in the sense of Moreau et al. (2004) were mobilized to better understand the perception of different actors about

community-based initiatives implemented by different institutions including INEAC and INERA. Interviews were conducted in February, March and May 2015 with local leaders and village elders. In order to generate productive group dynamics in each of these focus groups, the number of participants was limited to between six and twelve on average (Touré 2010). Each focus group was made up of women (a maximum of four) and men (a maximum of eight) of different ages: young people (18 to 29 years), adults (30 to 59 years) and old people (from 60 years old). Criteria used to select focus group participants included age, gender, and ethnicity. In each village, the average duration of the interviews with the focus groups was approximately two hours.

Semi-structured interviews were conducted with household members based on a general questionnaire of the first author's doctoral thesis comprising ca. 100 questions. Taking into account the objective pursued in this article, eight questions were analyzed to obtain the results presented below. The data from the other questions (92) were used in other articles.

The selection of 20 villages and 3 neighbourhoods constituting the geographic sample (Esiso Asia Amani 2013) was based on the criterion of their proximity to the reserve (Map 1). This was based on a demographic sample of 300 subjects (including 77 women and 223 men) out of 5 278 households identified by the medical service and local administration. This sample (n=300) represented two indigenous groups (163 Turumbu and 67 Bamanga) and a group of 70 allochthones people encountered in Yangambi. The choice of interviewees was made according to the convenience technique (Gavard-Perret et al. 2011).



Map 1. Location of the sample villages in the study area.

Data processing

The collected data was first encoded into an Excel spreadsheet. They were then pre-processed to correct the typing errors. In addition to calculating percentages and arithmetic averages, data processing and analysis focused both on the search for dependencies between measured variables, and on the comparison of ethnic groups. The link between the (qualitative) variables was measured using the Chi-square test of independence under the validity conditions described by Gavard-Perret et al. (2011) and Howell (2004). These are conditions related to the qualitative nature of the variables and the sample size (greater than 30 observations). This data processing task was facilitated by the use of Excel and R software (version 2.10.0).

Moreover, the participation of LCs in the design of local development policies was analyzed using three indicators tested by Simard (2000): the perceived control by the actors about their participation in the project and their influence on the decision-making process; satisfaction that expresses a positive or negative opinion about a project and its attributes; as well as the symbolism that emanates from the effective use of project achievements. Success in these three perceptions thereby becomes a measure of the ownership of these initiatives by local actors.

Results

Historical context of participatory initiatives in the governance of YBR

From 1933 to 1960

INEAC (replaced by INERA in1970), was entrusted with the management of the Yangambi Floristic Reserve (now YBR) by the Belgian colonial administration. INEAC depended, in part, on male labour hired from villages bordering YBR. Archive data collected show that after its establishment in 1934, INEAC engaged with the following villages: in Bosukulu I, 88 adult men out of 147; in Yandimbia, 18 out of 60; in Yalolia, 29 out of 106. In the Yalibua and Yakombe villages, it recruited 58% and 32% of all adult men respectively (Steens 1934; Laurent 1937).

INEAC attempted to protect YBR against slash and burn agriculture by, initially, limiting access to the reserve, and after 1942 by grouping farmers (Malengreau 1952; Staner 1955). For example, in 1948 Turumbu farmers established a cooperative as part of an INEAC initiative involving more than a thousand farmers. Earlier efforts by INEAC (and previously the Régie des Plantations de la Colonie) had focused on developing commercial agricultural plantations of palm oil and rubber. Their farm plots were located along the roads, around road intersections and/or near the source of a watercourse. The family land reserve was divided each year into corridors. Individual land ownership was not permitted. The farmers were supervised by INEAC agricultural engineers responsible for providing advice on different crops and the provision of agricultural inputs (tools and seeds). This allowed them to produce agricultural surpluses and to become progressively

sedentarized (Malengreau 1952). All agricultural products were purchased by INEAC. Village elders interviewed between February and May 2015 claimed that the socio-economic conditions of the people had visibly improved before independence in 1960.

Another project carried out in the Lilanda village, from 1956 by INEAC, concerned the production and processing of cassava (AIMO 1957). However, its activities were stopped in 1957 because of the low cassava production in this village (AIMO 1957).

After independence

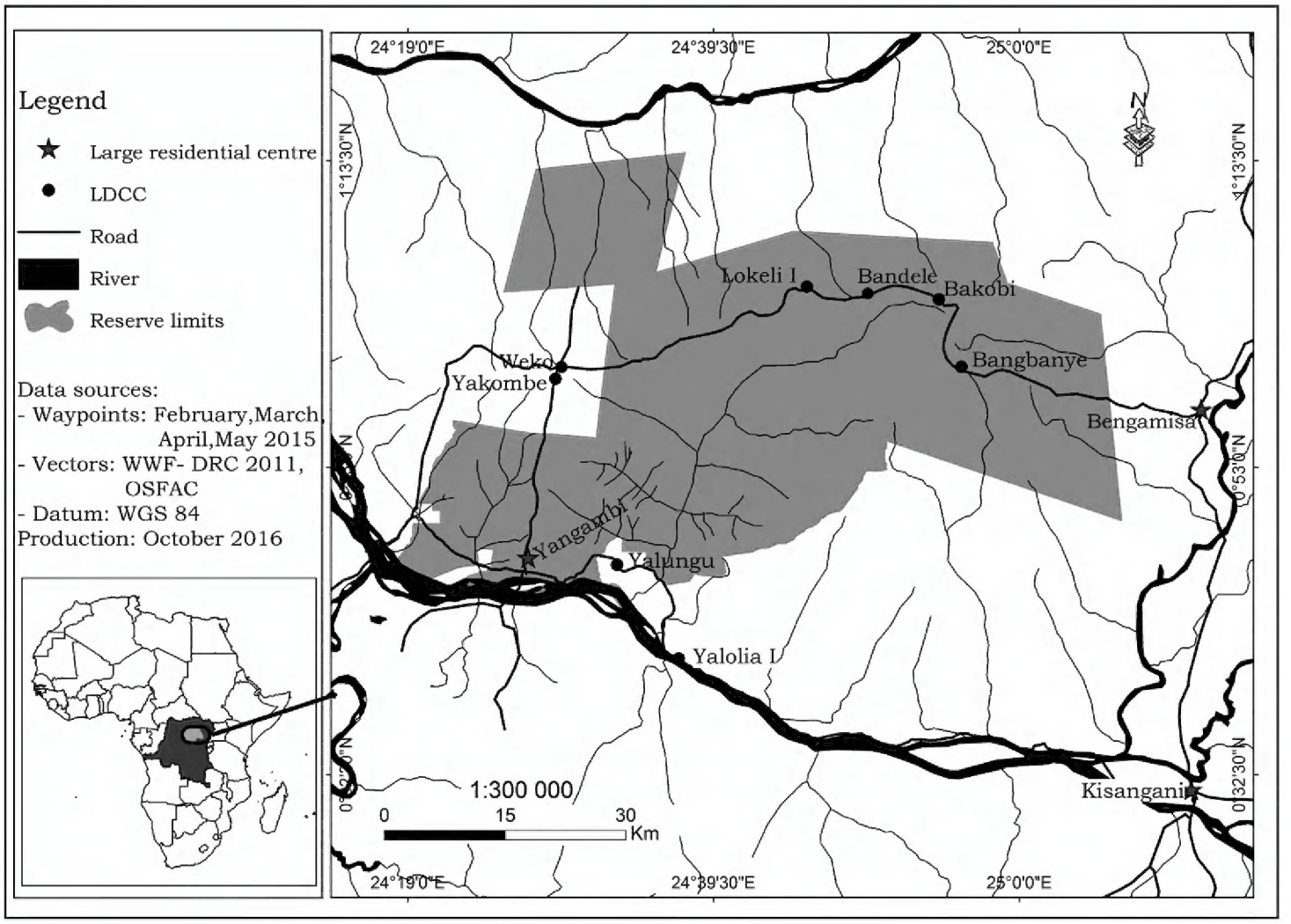
An effort to initiate management of YBR by multiple stakeholders was started in 1978 through a framework agreement on a Man and the Biosphere (MAB) Reserve concluded between UNESCO and the Congolese Government (RDC 2005). Under this agreement, the Department of the Environment, Nature Conservation and Tourism was to facilitate the coordination of actors, ensure the remuneration of MAB Project officers (eco-guards), maintain equipment and facilitate the movement of personnel between Kinshasa and Kisangani. INERA was to make premises, laboratories and workers including researchers available to the MAB project. Furthermore, the Institute Faculty of Agronomic Sciences (IFA) and the (then) Kisangani Campus of the National University of Zaire (UNAZA) were to ensure the provision of a team of researchers capable of conducting interdisciplinary field studies. UNESCO, for its part, was to support the project with assistance of US $ 26,000 (for the purchase of vehicles, materials and other equipment) and US $ 17,000 (to finance the training of local staff).The role and responsibilities of local communities in the MAB project was not discussed nor defined. The zoning carried out in the YBR was completed by INERA, IFA and UNAZA experts.

A subsequent project initiated in 2009 and implemented from 2010 with financial and technical support of the World Wildlife Fund (WWF), ensured that all YBR management stakeholders (MAB, INERA, IFA, LCs, civil society and local government) were structured and organized within a Local Steering Committee (LSC) based in Yangambi (Toirambe 2011). This provided a platform for consultation and reflection involving all stakeholders engaged in the management of the reserve. Semi-annual meetings were held in Yangambi throughout the duration of the project (2010–2012). Motorcycles, raincoats and bicycles were distributed to *eco-guards* who also received a monthly bonus of approximately US$ 5 to US$ 10.

At the village level, the WWF project contributed to the creation of Local Development and Conservation Committees (LDCCs). These structures were intended to bring together village members who were supposed to carry out activities contributing to both local development and nature conservation (Toirambe et al. 2011). A total of eight LDCCs were established (Map 2). WWF provided each of the LDCCs with four bags of cement, 18 metal roofing sheets, 10 wooden planks and three kilograms of nails for the construction of simple village offices. In addition, US $180 and 40 Kg of rice

seed were also provided to each LDCC (Interview with intern, socio-economic aspects of the WWF project, 15 May 2015). During fieldwork in Yangambi it was noted that apart from the office of the LDCC of Yalolia, built with complementary support from the Belgian technical cooperation (Bonkena and Vancutsem 2013), all other structures remained unfinished. Roofing sheets and other building materials were used for other purposes by the local communities. The rice seed distributed to LDCCs did not yield a satisfactory return.

Most recently, another project carried out by the World Conservation Union (IUCN) between 2014 and 2016 tried to revitalize the activities of the LDCCs by focusing on the rehabilitation and equipping of the MAB Yangambi office, the recruitment, paramilitary training, equipment, uniforms and monthly bonuses for 20 eco-guards, construction of two monitoring stations in Yapkondi and Yakombe, and drafting of the statutes and rules of procedure of the Local Steering Committee (Begaa Yendjogi 2016). Neither the WWF nor the IUCN project were able to establish a single LSC and none of the LDCCs were rendered autonomous. The impacts of their activities were, consequently, mixed (Bonkena and Vancutsem 2013; Begaa Yendjogi 2016).The following sections present the results of the interviews conducted with the different ethno-linguistic communities living in and around Yangambi Biosphere Reserve.



Map 2. Location of Local Development and Conservation Committees.

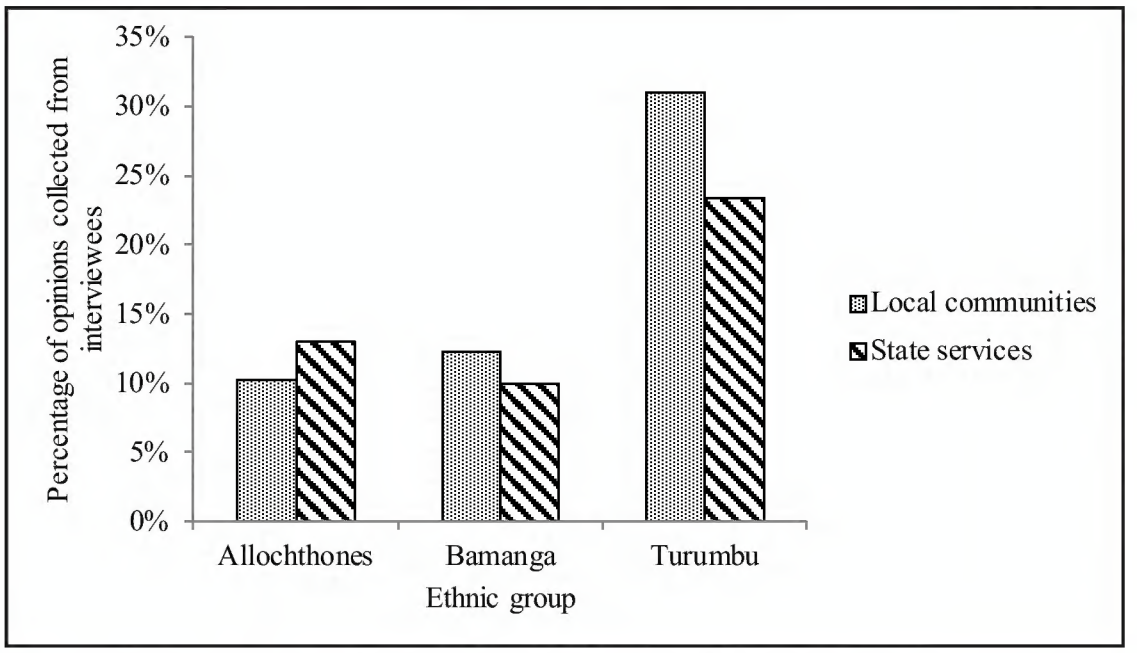


Figure 1. Perceptions of actors involved in the management of Yangambi Biosphere Reserve.

Who are the actors managing YBR that are recognized by the local communities?

It is perceived that the management of YBR is equally facilitated by the local communities and services provided by state institutions, notably INERA, MAB, IFA and the Superior Institute of Agronomic Studies of Bengamisa (Figure 1). From a statistical point of view, this perception does not depend on the ethno-linguistic group (X-squared = 0.31, df = 2, p-value = 0.86).

Limited local involvement in participatory initiatives

The participatory management initiatives of the WWF and IUCN projects described above were not influenced by local communities and had little impact. Most of these views were expressed in terms of local communities not being consulted during the establishment of the reserve nor in the design of the projects (Figure 2). This opinion was shared by the members of all ethno-linguistic groups surveyed (X-squared = 0.79, df = 2, p-value = 0.67).

In addition to the lack of consultation with local communities, state-backed managers of YBR and their global partners tried to educate and sensitize the local communities about reserve management and the importance of conservation in protecting YBR. We therefore asked the following question: were you made aware of the importance of nature conservation in the YBR? The interviews indicated that awareness had not been raised amongst most respondents (Figure 3). This opinion was expressed in similar terms by all ethno-linguistic communities interviewed (X-squared = 3.73, df = 2, p-value = 0.17).

This lack of consultation with, and limited awareness of local communities, did not facilitate the flow of information concerning project initiatives and the management of YBR. In fact, the perceptions expressed by interviewees about the ownership of this protected area – by the State or in the customary domain were not unanimous (Figure 4).

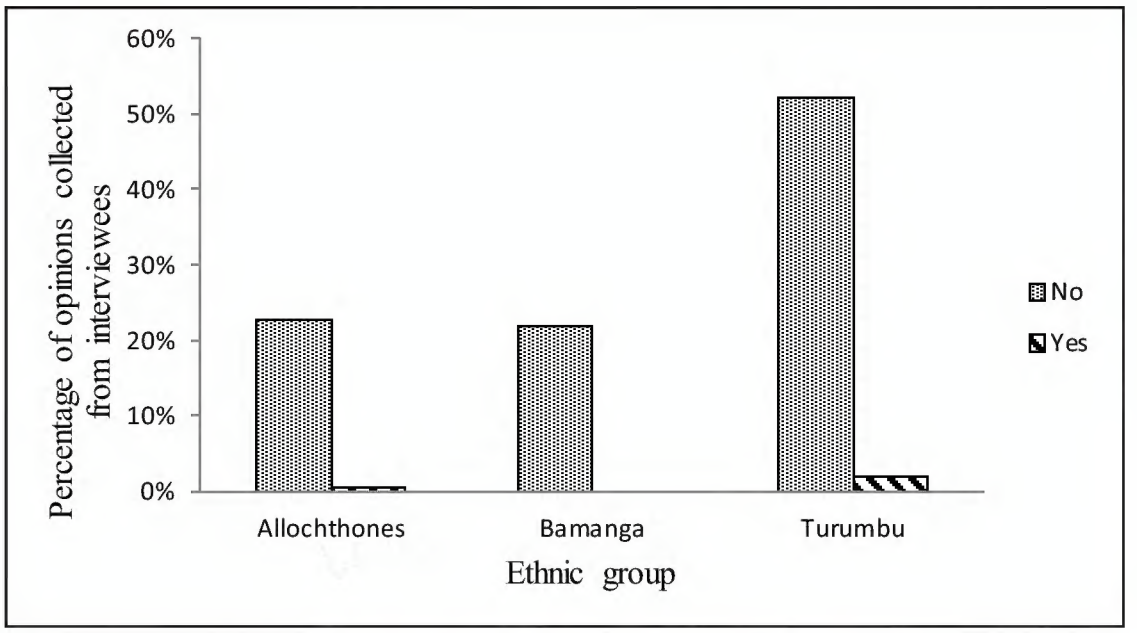


Figure 2. Extent to which local communities were consulted in the creation of YBR and in project design.

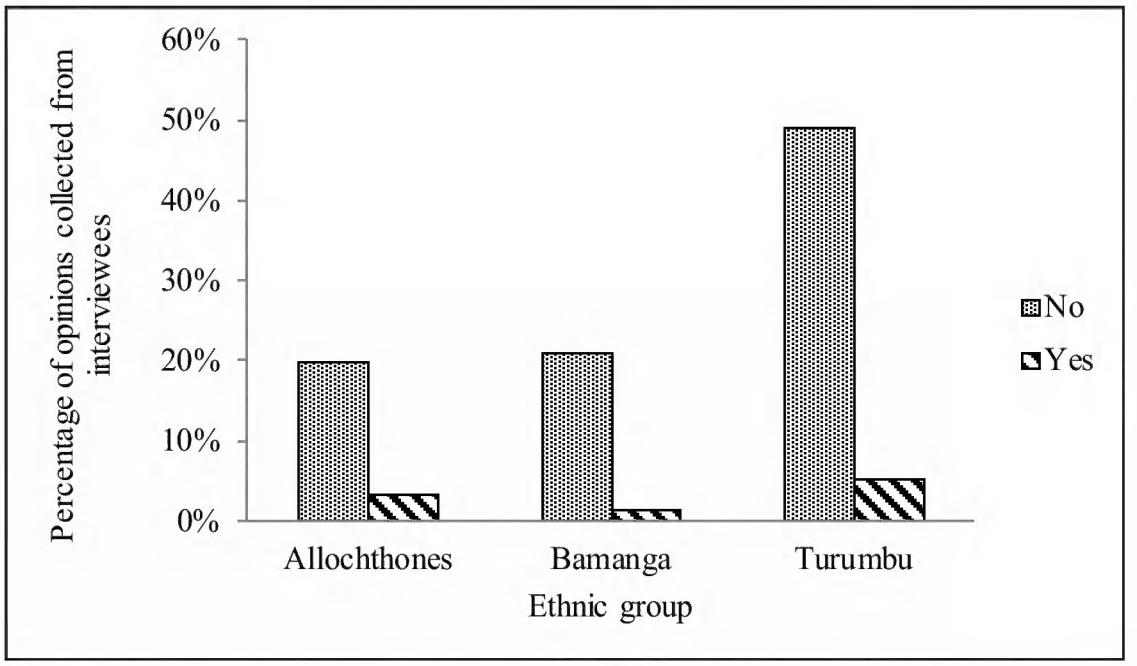


Figure 3. Opinion on awareness raising on conservation in Yangambi Biosphere Reserve management.

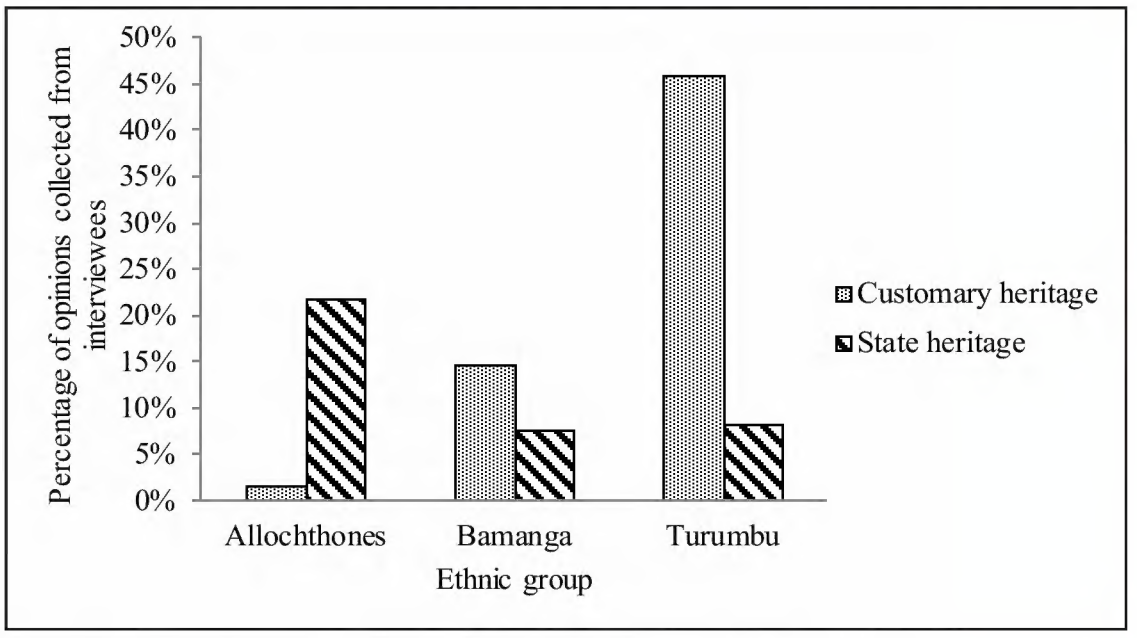


Figure 4. Local community perceptions of who owns Yangambi Biosphere Reserve.

Most of the Turumbu and Bamanga communities noted that this classified forest remains the customary property of local communities. Allochthones, on the other hand, to a small extent recognized the state property of this land and appeared to be aware about the activities of development partners and state management services. Statistically, the results showed a strong dependence between ethno-linguistic groups and respondents' opinions on state or local heritage of YBR (X-squared = 128.11, df = 2, p. value <2.2e-16).

Local communities dissatisfied with participatory project initiatives

The interviews indicated that local development projects implemented to facilitate the participation of local communities did not have any significant impacts. Furthermore, most respondents considered the impacts to be negative, although a few thought the impacts were low i.e. not significant (Figure 5).

From a statistical point of view, a significant dependence was noted between the ethno-linguistic groups and their opinions on the impacts of such projects (X-squared = 42.28, df = 2, p-value = 6.59e-10). The allochthones (generally met in Yangambi centre) and a few of the Turumbu people had varying opinions between low impact and negative impact. In contrast, for the Bamanga community, impacts were negative for all criteria surveyed.

This dissatisfaction of local communities reflected *inter alia* the limited knowledge of the importance or role of YBR in the area. A few people consider that YBR plays an important conservation role although the majority supports the opposite point of view, emphasizing YBR's importance in providing local communities with multiple natural resources to support their subsistence economy and survival (Figure 6). Some went even further by denying the importance of YBR in their community. Statistically,

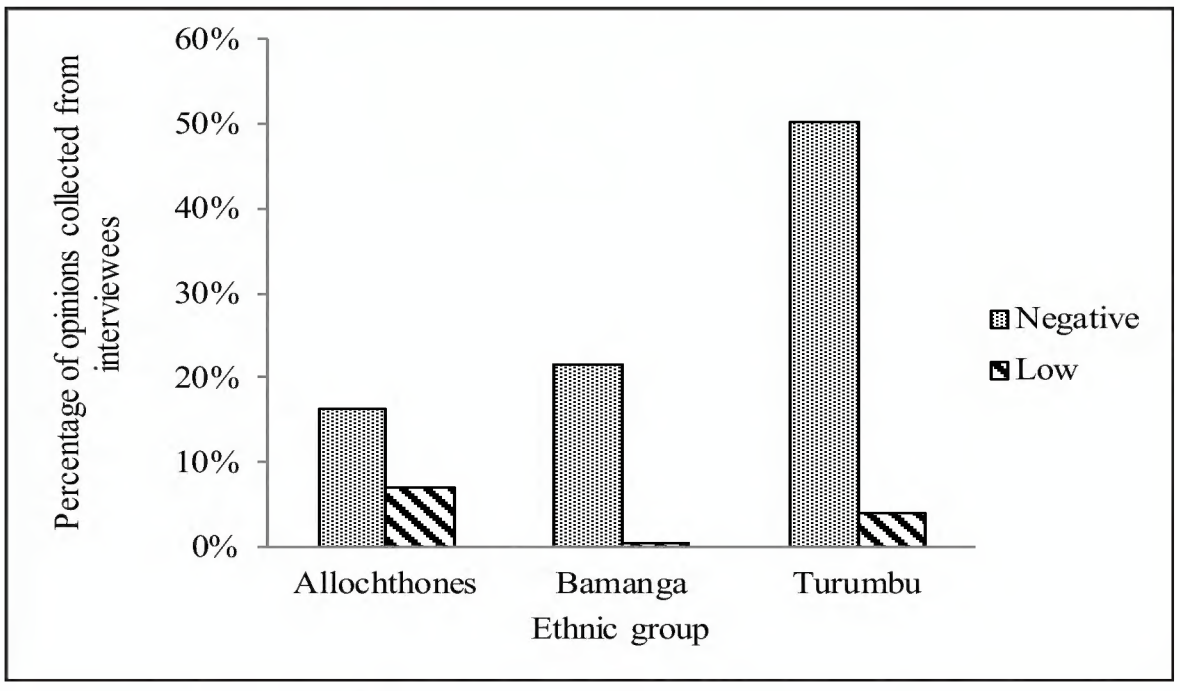


Figure 5. Opinion on the impact of development projects in the community.

results show a strong dependency between these opinions and the ethno-linguistic group (X-squared = 97.52, df = 4, p-value <2.2e-16).

In addition to the limited awareness of the ecological functions and importance of YBR, the management of the latter by state services was not favorably appreciated by the interviewees. Across all ethno-linguistic groups, most interviewees gave an unfavorable opinion on the management of YBR (Figure 7) although the respondents' opinions are not significantly dependent on the group to which they belong (X-squared = 1.01, df = 2, p-value = 0.61). In all the ethnic groups studied, the non-favorable opinion remained more important.

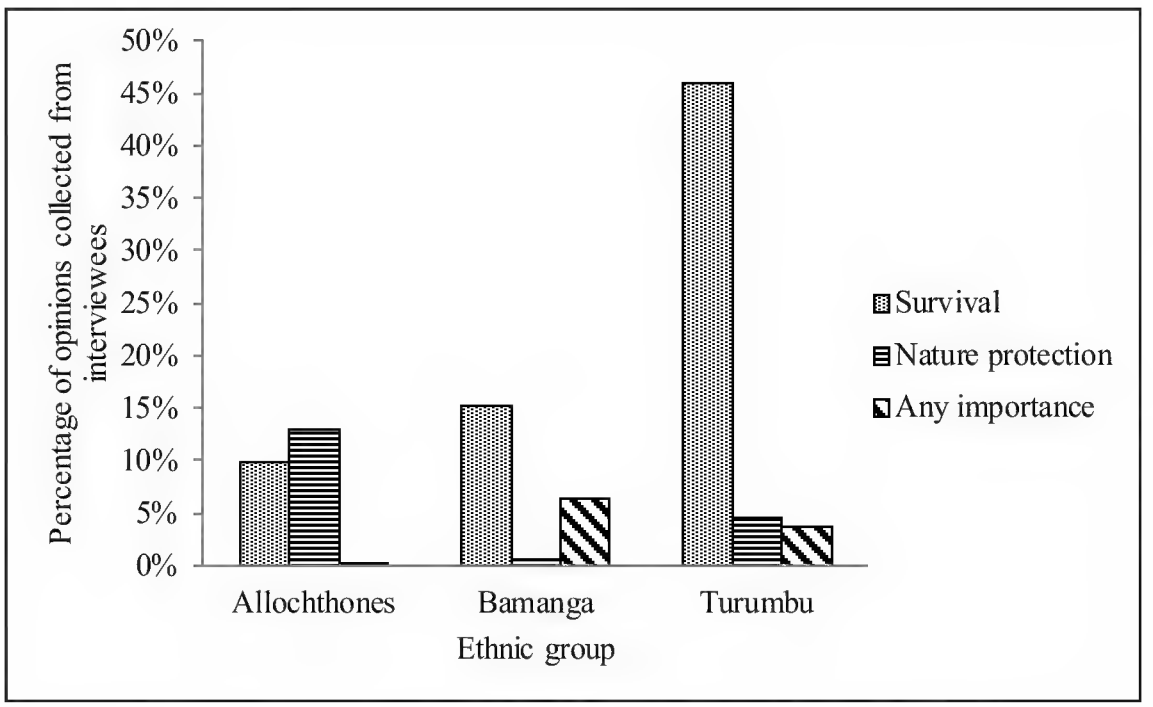


Figure 6. Importance of Yangambi Biosphere Reserveto local communities in the area.

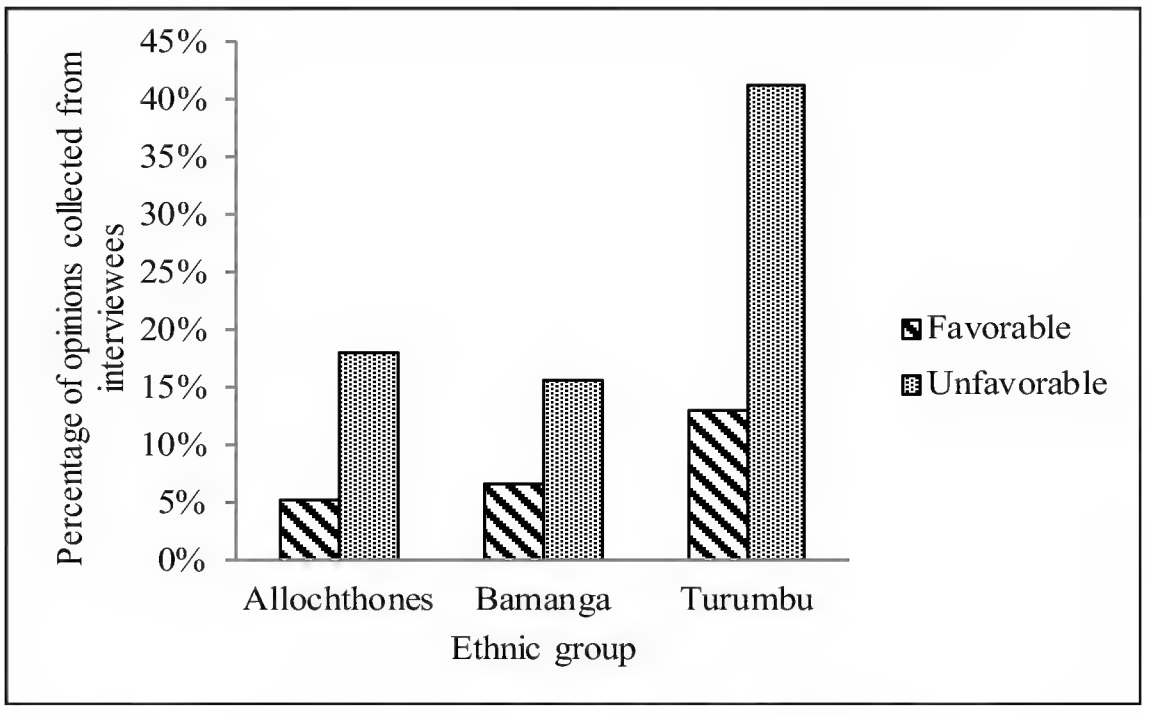


Figure 7. Opinion of interviewees on the management of Yangambi Biosphere Reserve.

Low sustainability of project achievements

The policies and projects implemented by different actors in order to involve local actors in the management of the natural resources of YBR have not contributed to developing sustainable land use systems. Archival sources show that until 1956 the Turumbu cooperative produced about 2,000 tons of agricultural products annually (AIMO 1957). By 1957 the activities of the Turumbu co-operative and Lilanda's "Cassava Plan" were already beginning to decline (AIMO 1957). After the departure of the Belgian colonial administration, the achievements of the cooperative and farmers in Turumbu were reduced to zero. In 1968, the cooperative was closed.

The MAB project has in turn met similar problems in its implementation. Even though its aim was to strengthen human and institutional capacities, the sustainability of the actions envisaged at the beginning has not been achieved. The maintenance of vehicles, outboard motors and laboratory equipment made available to the project by UNESCO has not been carried out by either the local or national government. UNESCO subsidies did not reach their intended beneficiaries. Four research programs were planned covering both the human and natural aspects of the YBR in the MAB-DRC agreement. None of these have been achieved. The internships and fellowships financed by UNESCO did not serve in the management of the YBR. This must, therefore, be considered a poor result of the MAB program.

The project implemented by WWF between 2010 and 2012 in the YBR failed to sustain its achievements. Today, the LSC and LDCCs are, to all intents and purposes, non-operational in the field. The same applies to the IUCN project. To collect the information on this subject, the following question was asked of the respondents: do you have some memories of the achievements of the projects implemented in your region? Across all ethno-linguistic groups, most of those surveyed said that, in the current context, the achievements of the local development projects are non-existent (Figure 8) (X-squared = 2.68, df = 2, p-value = 0.26). Those who remember some achievements that are still

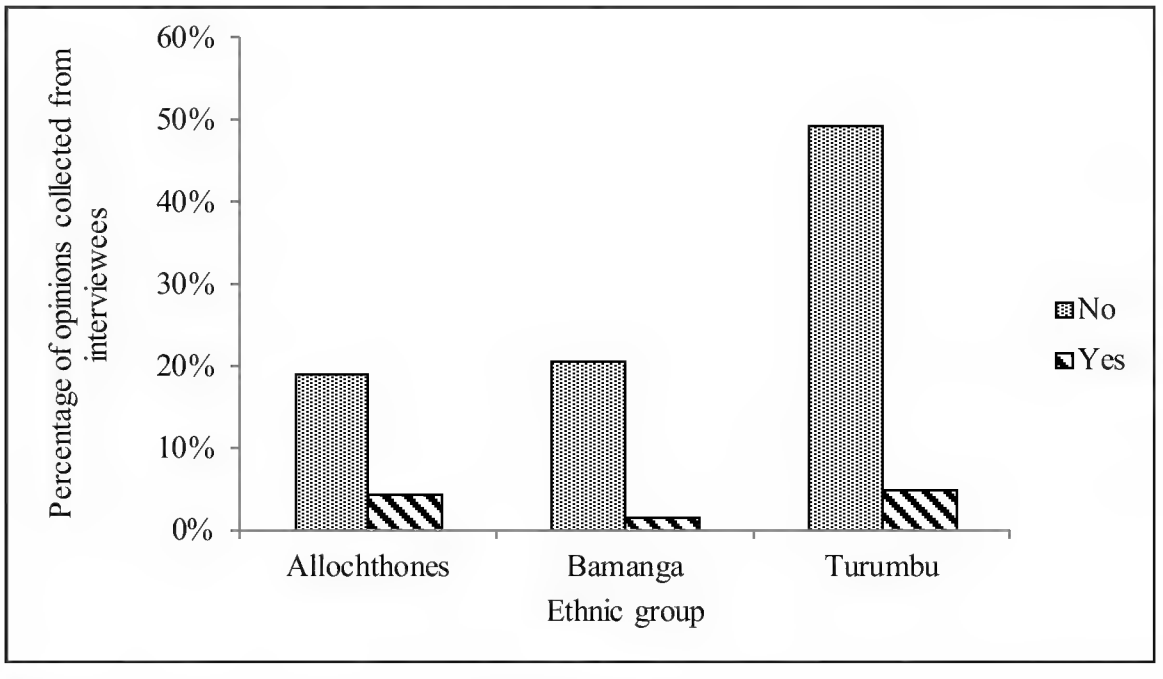


Figure 8. Perceptions of the achievements of local development projects.

visible in the area alluded to the presence of *eco-guards* and/or some roofing sheets that continue to be guarded by the presidents of the LDCCs. This concerns usually the inhabitants of the villages where the LDCCs and the MAB stations were originally established.

Discussion

Local communities marginalized during the design and implementation of local development projects

The results show that for local communities there are two categories of management actors for YBR: state services and communities. However, it would be difficult to suggest that LCs are very much involved in making decisions about the management of the reserve. This perception arises because YBR offers almost completely open access for the communities, despite the presence of state management structures. YBR is, therefore, understood by local communities as simply a space for exploitation and extraction of natural resources where one rarely meets the state actors who are supposed to monitor and control such activities.

The results also revealed that LCs were not consulted either during the establishment of the reserve or the design of local conservation and development projects for which they were supposed to be the main beneficiaries. This state of affairs can be explained by several pieces of logic. On the one hand, projects carried out in the field were based either on experiences acquired elsewhere, or on the basis of studies in and around Yangambi carried out only by researchers. To facilitate community ownership of these projects, local knowledge remained poorly mobilized. As Kellert et al. (2000) noted in Kenya and Nepal "…local communities were frequently only marginally more empowered than prior to the implementation of community-based natural resource management, with considerable control still residing in national and state authorities".

How was it possible that all local communities who were members of the LDCCs were supposed to benefit from the same goods and services considering that their priority needs differed between them? Since the benefits for the local communities did not emanate from their own needs the actual intervention logic applied was already predisposed to failure and weak ownership. According to some authors, greater local participation in decision making or, at the very least, a better understanding of local needs and desires and the incorporation of these are key aspects in the design and implementation of conservation and development programs, and underpin decentralization theory (Ribot 1996; Agrawal and Ribot 1999). Pamard and Fauroux (2004) noted, for example, that "the failure of development interventions in western Madagascar is mainly linked to a top-down approach that does not allow people to truly take ownership of innovation". It can also lead to the disempowerment of local actors by conservation professionals (Rodaly 1998).

The Belgian colonial period was not renowned for consultation with local communities. The establishment of YBR in 1939 was no different as INEAC expanded

the area under its control. Rural farmers were considered as subjects (having only subsistence and usufruct rights) and not citizens (Ribot 2001; Mamdani 2018). This is clearly noted in the annual report of INEAC in 1939: "the northern limits of the reserve will not be marked because our ambition is to extend it to the left side of the Aruwimi River".

Customary rights of local communities can be substantially reduced through policy interventions in biosphere reserves (Maikhuri et al. 2001). Bennett and Dearden (2014a) also noted a lack of transparency in processes of establishing national parks in Thailand. This can result in sustained conflicts with state actors because, as Castro and Nielsen (2001) noted, "the low participation of local actors is often the source of conflicts between state services and local communities". West et al. (2006) also commented that "…conflict is often at the heart of protected area establishment and maintenance. In part, this is because of clumsy top-down approaches by states that fail to appreciate, or work with, local practices and interests".

To compound matters, the legal texts that have governed the conservation of nature in DRC since the Belgian colonial era until 2014 have not been favorable to the participation of local communities. Utshudi Ona (2008) noted that the colonial era was characterized by Congolese submission to the colonial system, and did not allow rural communities to participate in the elaboration of texts or standards related to the conservation of nature. The ordinance establishing the YBR excluded all LCs in the demarcated area. Similarly, the ordinance-law n° 69-041 of August 22nd 1969 which governed the conservation of nature until it was replaced in 2014 by the law n° 14/003 of February 11th 2014 confirmed the exclusion of local communities in any process of establishing protected areas in its first article, viz., "… any part of the Republic may be constituted as a nature reserve when the conservation of fauna, flora, soil, water and in general, of a natural environment with a special interest and it is important to exclude this environment from any intervention likely to alter its appearance, composition and evolution ".

The exclusion of local communities mitigates against the conservation of nature in protected areas, and constitutes a real challenge in the implementation of participative approaches and can be a frequent source of conflicts with states services. According to Shackleton et al. (2002), the exclusion of traditional leaders from conservancy committees in Namibia was counterproductive, resulting in conflict and delays, until these leaders were co-opted on to the committees. Promoting dialogue between managers of protected areas and local communities, involving affected stakeholders in protected area planning and implementation, identifying areas of common interest between protected areas and local communities, and including community representatives on advisory management boards for protected areas can greatly assist in reducing conflicts between parks and local people (Hough 1988). Fontanon (1994) noted, furthermore, that the "…socio-economic exclusion of individuals and territories reflects a lack of citizenship and establishes a partial citizenship within a society". Again, it should be stressed that biosphere reserves in DRC have an unclear legal status as so-called 'protected areas', which also renders community participation problematic.

The concept of "biosphere" or MAB is a construct of UNESCO and has not yet been accompanied by legal texts that clearly describe their conservation objectives within DRC. This leads to a situation in which LCs rights are challenged, yet the establishment of a biosphere reserve establishes flexible and adaptive partnerships between LCs and the responsible authorities.

The results of the study also highlighted that most respondents were not aware of either the importance of YBR and/or the different participatory projects implemented in and around YBR. Several factors could explain this state of affairs. First, there is weak representation of grass root representatives at the LSC level. Local chiefs have been negotiating compensation for land appropriated by INEAC/INERA and the Turumbu community spanning more than 80 years. This compensation has been the subject of complaint up to today by the local communities (Interviews with Basanga, Bosala Selenga and Kaisala Bosendji respectively on March 11, 2015, April 1, 2015, April 25, 2015). Second, project leaders often prefer to spend all their time in Yangambi where they have relations with INERA and MAB to the detriment of the local communities. Finally, isolation due to poor rural infrastructure and limited public transport services does not facilitate the movement of state and private actors involved in the management of the YBR. This is particularly acute for the Bamanga community.

Yangambi Biosphere Reserve – between state and customary ownership?

The results of the study showed a strong dependence between ethno-linguistic groups and respondents' opinions on the ownership of YBR which is contested between the state and local communities. The Bamanga people because of the isolation are rarely associated with the management activities of YBR. This has accentuated their relative ignorance about the very existence of the reserve. As a result, the "protected area" of YBR continues to be perceived as a part of customary lands managed by the LCs. Ciocănea et al. (2016) also noted in their study that 21.7% of the respondents declared that they did not know about the existence of the Iron Gates Natural Park in Romania. Similarly, the findings of Rao et al. (2003) in the Nanda Devi Biosphere Reserve in India showed that local residents did not have extensive knowledge of the objectives of this biosphere reserve.

The question of meeting subsistence needs to survive is clearly mentioned in the respondents' opinions on the importance of the reserve to the community (Figure 6). The forest in a poor rural environment provides the population with a multitude of Non Timber Forest Products as critical seasonal sources of food as well as building and craft materials, medicines and minerals. Thus, YBR constitutes a critical source of livelihoods to sustain its riparian communities. Given the demographic pressure in the region (37,679 inhabitants in Yangambi, 79,098 inhabitants in Turumbu and 110,154 inhabitants in Bamanga), if YBR had not been established as a Floristic Reserve, a higher rate of deforestation and forest degradation would have probably been recorded.

Mixed social representation on the management of the *YBR* by the State and its partners

Local community perceptions of protected areas management can be either favorable (Ciocănea et al. 2016) or unfavorable (Bennett and Dearden 2014a). This study also revealed that the way in which YBR is managed benefits from weakly favorable opinions amongst the local communities. Several factors explain this.. First, the mode of management that prevails in the context of YBR has remained predominantly authoritarian. This shows that despite the participatory discourses mentioned by different actors, state services continue to exercise authoritarian power in practice. Neumann (1997) also concluded that, "despite the emphasis on participation and benefit-sharing, in Africa, many of the new projects replicate coercive forms of conservation practice and often constitute an expansion of state authority into remote rural areas". Denieuil (2008) also noted that "the failure of approaches to both community development and rural animation in Africa is due to the contradictions on the ground between the democratic and humanitarian basic participatory approach, and the sometimes directive and not always differentiated application of the authoritarian and dictatorial structures of African public administrations". *Eco-guards* recruited within MAB since 1979 contributed to the destruction and expropriation of canoes built by local communities. One member of the Turumbu community was killed when he refused to surrender his canoe. Some chiefs had canoes made for them, others charged taxes to the LCs who carry out informal activities in YBR. Artisanal mining prospecting and logging licenses were granted by MAB personnel in accordance with decisions of state services. Such types of informal activities often associated with slash-and-burn agriculture remain a major challenge in the management of YBR.

As a result, prohibited activities are often practiced by agents who should normally be committed to their prohibition. Thus, INEAC/INERA which appropriated the customary lands of the Turumbu and Bamanga peoples and which has managed YBR since its creation, has not managed to put an end to the land disputes with the local communities.

Another factor concerns the relative lack of information about YBR, or access to information by local communities despite several conservation and development projects and their failed environmental education efforts. As Ciocănea et al. (2016) noted, "Limited knowledge, information sources and activities carried out in protected area lead to a deformed perception on protected areas. These represent real challenges for authorities and administrations involved in protected areas management that should straighten their objectives to a better communication and collaboration with the residents of Iron Gates Natural Park, because it is essential to encourage public participation and deliberation to achieve a sustainable management of protected areas".

Finally, there is limited representation of, and consultation with, local communities. LCs representatives are often only associated in the last instance. One of the critical steps for sustainable management of protected areas is to know that the people living nearby have to be informed about permitted and prohibited activities, and they need to trust the responsible institutions for environmental management and their effective-

ness (Bogaert et al. 2009; Kim 2009).This is a big challenge in the management of YBR because many authors argue that local participation in decision making makes people more likely to have a sense of 'ownership' of those decisions (Larson and Ribot 2004).

A local culture hostile to the appropriation of development initiatives

The results highlighted weak sustainability in terms of the achievements of conservation and development projects. Apart from farmers linked to the Turumbu cooperative, which had produced results recognized by the people of the Yangambi region, the projects implemented by WWF and IUCN have generated very limited impacts. According to Gibson and Marks (1995), many integrated conservation and development projects in Africa have failed in their goal of conservation because the incentives presented to communities are public goods and are insufficient to alter individual behaviour. Poteete and Ribot (2011) also noted that in Botswana, "residents of wilderness areas complain bitterly about the lack of local benefits from tourism and the limits placed on their livelihood strategies in the name of conservation. According to one popular refrain, the government only cares about the welfare of wild animals". The lack of linkages between development and conservation is a factor in the failure of livelihoods programs in protected area management (Torell et al. 2010; Bennett and Dearden 2014b).

In some cases the local communities argued that farmers and the Turumbu cooperative contributed to improving their basic socio-economic conditions in the past. This seems to be corroborated by the point of view of Ahrouch (2011) who emphasized that "through their values of democracy, solidarity, sharing and mutual aid, cooperatives play an increasingly important role in economic and social development". However, it seems paradoxical that these initiatives did not survive after the country's independence. Speaking of the future of farmers in the Congo, Staner (1955) had already stressed that "the native cannot succeed alone in modernizing his agriculture. The operation will raise delicate political and psychological problems. The intervention of the public authorities will therefore remain indispensable in the years to come ".Unfortunately, the postcolonial Congolese state has failed to consolidate such a policy that could solve the problem of poverty in the rural world despite the State creating the Cooperative Development Office (ODCO) in 1963 as the administrative structure responsible for supporting cooperatives in the fields of training and information, as well as legal support.

However, even if the public authorities are failing in this area, it also seems necessary to analyze this issue from the angle of African tradition or culture. Tradition is marked by inequalities between ethno-linguistic group, status, roles, age and gender. To consider implementing cooperatives and/or participatory systems in this context remains a delicate undertaking. Denieuil (2008) emphasized in this regard that the African tradition opposes participatory approaches because it does not postulate autonomy of the individual, who often remains blocked in a highly hierarchical group. Participatory community development implies equality between individuals in the African village, and therefore challenges the organization of traditional systems (Meister 1977).

Conclusion

The participation of local communities in the governance of Biosphere Reserves is still controversial to the present-day in the Democratic Republic of Congo some forty years after their establishment. The challenges are many and their origins are diverse. Focusing on the case of Yangambi Floristic reserve created in 1939/Yangambi Biosphere Reserve (YBR) (after 1977), this paper has identified the many challenges in the implementation of participatory approaches to managing YBR. In terms of external factors, it is important to underline the predominance of 'logic from above' comprising both the explicit and legal exclusion of local communities in protected area management and in the design of local conservation and development projects and policies. In terms of internal constraints, the almost permanent dependence of local actors on external support limits the sustainability of the impacts of local development projects. Thus, in the context of YBR, the participatory approach adopted has been essentially top-down, as defined by Beuret and Trehet (2001).

The failure of local development and/or participatory projects and policies has resulted in the emergence of mitigated perceptions of local communities about their place in the participatory governance of YBR. Participatory management and/or local development initiatives are only functional while their initiators are present in the project area. Once the project is finished, any achievements are unlikely to be sustained by the local communities. Thus, the participatory approach is still an illusion in the context of the management of Biosphere Reserves in the DRC. Furthermore, although Biosphere Reserves in DRC are recognized as part of the national network of protected areas since 2002, their management is still not aligned to either the Seville Strategy or the statutory framework of the world network of Biosphere Reserves (UNESCO 1996). As Bennett and Dearden (2014a) noted with reference to marine protected areas in Thailand, successful implementation of such an approach requires the definition of local development policies focused on the reduction of poverty through the diversification of sources of income, creating an enabling environment to promote rural development and investments to revive the activities of cooperatives, Small and Medium Enterprises and private companies, and the integration of local and traditional knowledge into management.

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